Gallatin ("Trans. Am. Ethn. Soc.," vol. i, p. 97), believed in the destruction of the world four times by various causes, on each occasion of which the sun also perished, so that the present is the fifth sun.

MICROSCOPY.

GASES AND VAPORS IN MICRO-CHEMISTRY.—Mr. E. Ray Lankester describes in the "Quarterly Journal of Microscopical Science" his gas-chamber, which is a modification of the one used by Schweigger-Seidel. A watch-glass-shaped piece of glass has its edges ground and cemented to a flat plate of glass. The top of the dome thus formed is ground away so as to make a large opening into its cavity, and closed by a thin cover glass which bears the object to be examined upon its under surface and therefore inside of the cavity of the dome. This covering glass is held in position, and the joint rendered air-tight, by means of oil. Into the top and sides of the dome are inserted glass tubes, three in number, through which re-agents, in the form of gas or vapor, are introduced into the dome by means of suction or of pressure. To prevent too rapid drying of the object, as a drop of blood, the gas may in some cases be previously passed through warm water in a Wolff's bottle. Heat may be applied by introducing one end of a stout copper wire through one of the tubes, and heating the end which remains outside, or by similarly introducing a platinum wire connected with the poles of a galvanic battery. In this manner liquids may be vaporized inside of the dome, if desired.

Among the re-agents thus used are water, hydrochloric acid gas, carbonic acid gas, acetic and osmic acids, nitrogen tetroxide, hydrogen sulphide, chlorine, iodine, bromine, ammonia, alcohol, ether, chloroform, carbon bisulphide and carbolic acid.

The advantages claimed for gaseous re-agents are, that some can be used in no other state, that they are applied without a deluging stream which might displace the particles under observation, that the action of diluents (as water or alcohol) is avoided, and that minute traces of the re-agent may be introduced, increased, stopped or counteracted with great facility. The author believes that in chemical histology all re-agents should be applied in the gaseous form, though not exclusively so, if possible.

MICROPHOTOGRAPHY.—A good popular article on this subject is published by Mr. Charles Stodder in the "Boston Journal of

Chemistry." The history and advantages of microscopical photography are well given, though no reference is made to the corresponding disadvantages, such as the unequal applicability of the process to objects of different colors, and the necessity of representing a single focal plane or section of the object, while the different varieties of delineation by hand-work enable the artist, if sufficiently expert to know what he sees, and sufficiently candid to draw what he sees and not what he thinks he ought to see, to reconstruct to some extent the object and represent at a single view the knowledge gained by many slight changes of focus. Unfortunately for their value as tests in this case, the so-called test-objects seem to be particularly suitable for photographic illustration. Of the Woodward photographs familiar to the writer, those of the test-objects are (probably necessarily) more faultless than those of the tissues, and are therefore tests of the corrections of the objectives and of the perfection of the illumination rather than of the general applicability of the photographic process. Of this latter question, but little understood as yet, the researches of Dr. Woodward and others give promise of an early solution.

Mr. Stodder applies the name of microphotograph to the enlarged photographic representation of a microscopic object, such as the well-known productions of Dr. Woodward and of Dr. Maddox, although, since that name was previously appropriated to the reduced photographs for microscopical inspection taken from large objects, some microscopists have recently preferred, for the sake of distinction, to designate the enlarged photographs of small objects by the name of photomicrographs.

Curious Varieties of the Liber. — "The Lace Bark of Jamaica (*Lagetta lintearia*), is composed of a series of concentric layers of very fine and strong fibres, which, by crossing and interlacing each other, form a complete network, the beauties of which are quite hidden till the bark is beaten out, and the fibres partially separated by carefully pulling them in a lateral direction, when a piece of vegetable lace a yard or more in width, will be produced. This natural lace is used in Jamaica for making hats, caps, collars, frills, etc. . . . . The bark of the Paper Mulberry of the South Sea Islands is another of the fibrous kinds; it is very strong and tough, and is used in the Pacific Islands for making what is called tapa cloth, which serves the natives for

various articles of clothing. Another remarkable fibrous bark is the *Antiaris saccidora*, called the Sack Tree in Western India and Ceylon. The bark of this tree is used for making sacs, hence its common name. A trunk is selected of the requisite diameter, and a piece is cut off, of the required length; the bark is then, soaked and beaten, loosened from the wood, and turned back or inside out; if it is entirely stripped off, it requires simply to be sewn up at one end, but it is usual to leave a small piece of the wood to form the bottom. The bark is toughly fibrous in the Stringy Bark Tree (*Eucalyptus gigantea*) of Tasmania: while in the Iron Bark it is tough and might be taken for a close-grained wood. The ashes of the bark of the Pottery Tree of Para, whose cells are shown by the microscope to be silicated, is mixed with clay by the Indians, and made into a kind of earthenware which is very useful and durable."—Mr. Jackson, *of the Kew Museum*. From the *Monthly Microscopical Journal*.

Lepidopterous Scales.—Chevalier Huyttens de Cerbecq of Brussels, after careful study of the scales of butterflies and moths, with immersion objectives and transparent illumination of high powers by the paraboloid, is satisfied of the beaded structure of the scales of most insects, if not of all.

Dr. John Anthony describes the markings on the ribs of the "battledore" butterfly-scales as consisting of heads or knobs elevated on stalks. In his plates in the "Monthly Micoscropical Journal" they stand up like door-knobs or like the glandular hairs on some plants. He uses light reflected from a rectangular prism carefully centred, and limited by the diaphragm; and as the appearances are well seen with objectives as low as one-fifth inch, he judges that they will be readily seen by other observers.

Grinding Diamond Points.—Mr. F. H. Wenham, with his accustomed liberality which the world will not soon forget, publishes in the "Monthly Microscopical Journal" the method by which a fragment of diamond may be turned in a lathe to a point as fine as a needle. These points are easily prepared, and are the right thing for glass ruling, being used in Peter's writing machine, and probably by Nobert. A splinter of diamond is mounted on the end of a wire, chucked in a bow-lathe, and turned against another splinter similarly mounted. The importance of this suggestion may be inferred from the fact that Mr. Stanistreet, whose machine

was calculated to rule lines to the $\frac{1}{100,000}$ of an inch could not procure any diamond fine enough to rule more than about five thousand to the inch.

VITALITY AS AFFECTED BY TEMPERATURE.—Mr. Grace Calvert found that 300° and sometimes 400° Fahr. are sometimes required to destroy living germs; also that animalcules could live for hours at seventeen degrees below the freezing point of water.

MICROSCOPICAL MANIPULATIONS.—Mr. Stanistreet justly judges that other amateurs will be encouraged by learning that the machinery for ruling his already famous lines was entirely constructed by himself, untaught and unassisted, while confined to the house by illness.

FIBRES OF FLAX AND HEMP.—Mr. Suffolk states that a committee, on which he was appointed by the Queckett Club, undertook the study of these fibres with reference to their discrimination with the microscope in mixed fabrics; but abandoned the work on finding the fibres too much alike to be distinguished.

DARWINISM AND HISTOLOGY.—Dr. Lionel Beale, in his address to the Queckett club, counsels a careful comparative study of the tissues of man and the apes, in order to verify, if possible, the correspondence which has been asserted but not proved to exist between them.

STAINING AND CUTTING LEAVES.—Dr. R. Braithwaite, in his elaborate study of the bog-mosses, stains leaves by immersion from two to twenty-four hours in iodine and sulphuric acid or a solution of biniodide of zinc, preferably the latter. Transverse sections he obtained by soaking the leaves in thick mucilage of gum arabic, and, when partially dried, enclosing between pieces of elder pith and slicing into water.

ALTERNATION OF GENERATIONS IN FUNGI.—Mr. M. C. Cooke reviews, in "Nature," the experiments of Oersted and of De Bary on this subject. Most Uredines have two forms of fruit, but it is exceedingly difficult to prove an alternation of generations in any case. When the spores of fungi are sewn upon a plant, or introduced by inoculation, it is nearly impossible to prove that other fungi subsequently appearing on the same plant owe their presence there to the spores intentionally sewn or inoculated.

PRESERVATION OF FRESH-WATER POLYZOA.—Mr. Stewart explained to the South London Microscopical and Natural History Club that he had succeeded in killing polyzoa with the tentacles expanded by adding a few drops of the best French brandy to the water they were living in. They were overcome by the liquor, without drawing in their plumes.

CRYSTALLIZATION OF METALS BY ELECTRICITY.—This has been studied under the Microscope by Philip Braham, Esq. His apparatus is described in the "Monthly Microscopical Journal," for Dec. 1871.

CONJUGATION IN RHIZOPODS.—J. G. Tatem, Esq. has observed what seems to be an instance of this hitherto unnoticed, though not unsuspected, process in the case of a common Amœba.

PHOTOGRAPHING BY BLACK-GROUND ILLUMINATION.—Dr. Woodward has obtained good high-power photographs (x 1000) of objects illuminated by Mr. Wenham's truncated lens.

CLEANING DIATOMS.—Dr. Maddox cleans and bleaches diatoms by immersion in a solution of chlorate of potash and hydrochloric acid.

MICROSCOPICAL STRUCTURE OF THE WAX OR BLOOM OF PLANTS.—An interesting study of this familiar substance occurring on leaves and fruits, by Prof. De Bary, is given in the "Botanical Zeitung," with some thirty beautiful illustrations. The wax does not appear to be a simple coating over the surface, as though it might have been laid on liquid with a brush, forming a continuous layer. It is seen to be rather a dense forest of minute hairs of wax; each one sitting with one end upon the epidermis and the other either rising up straight or rolled and curled among its neighbors. This matting of waxen hairs often becomes so dense that when examined from the surface it presents to the microscope the appearance of a continuous layer, while a carefully made section of the leaf, or skin of the fruit, shows its true structure. The question from what part of the epidermis or subepidermal tissue does the wax come, is most beautifully and clearly answered. He says that in the cell-contents there cannot be discovered the slightest trace of wax, and the statement that the chlorophyll is partly made of wax is totally erroneous. The locality

in which it can be first detected is the cuticle and the cuticularized elements of the epidermis cells.—T. D. B.

NOTES.

Prof. Agassiz read a notice of the life and character of Dr. E. Holbrook of Charleston, S. C., before the Natural History Society of Boston, Oct. 18, 1871. He remarked that:—

"The death of Dr. Holbrook has been deeply felt by a very large circle of friends, and by those who are acquainted with the history of science during the last fifty years. But highly as he was appreciated by all to whom he was personally known, and by his scientific peers and colleagues, America does not know what she has lost in him, nor what she owed to him. A man of singularly modest nature, eluding rather than courting notice, he nevertheless first compelled European recognization of American science by the accuracy and originality of his investigations. I well remember the impression made in Europe more than five and thirty years ago, by his work on North American reptiles. Before then, the supercilious English question, so effectually answered since, 'Who reads an American book?' might have been repeated in another form, 'Who ever saw an American Scientific Work?' But Holbrook's elaborate history of American Herpetology was far above any previous work on the same subject. In that branch of investigation Europe had at that time nothing which could compare with it.

Born near the close of the last century, in 1796, Dr. Holbrook entered upon his career as a student at a moment of unusual activity in scientific research in Europe. Although his birth occurred at Beaufort, S. C., he received his early education at the north. His father, himself a New England man, brought him, when only a few months' old, to Wrentham, Mass. There he grew up, and though his after fortunes led him back to his birthplace and the greater part of his life was passed in South Carolina, he remained warmly attached to the home of his boyhood. From school he went to Brown University, and after completing his college course there he studied medicine in Philadelphia, and subsequently practised for a short time with a physician in Boston; but he took a larger and more comprehensive view of his profession than that of the special practitioner, and he went abroad to seek a more general scientific culture. He went through the Medical School at Edinburg, and then travelled on the continent, making himself familiar with methods of study and practice there. But perhaps nothing in all his European journey had greater influence upon his future life than his stay in Paris, where he worked at the Jardin des Plantes, and became intimate with some of the leading scientific men of the day. He formed relations then which ended only with